What we claim is:

1. A method for transmitting digital data, comprising:

splitting a coherent optical carrier having a subcarrier into mutually coherent optical carriers;

producing sequences of phase shifts in each of the mutually coherent optical carriers; and

interfering the mutually coherent optical carriers to produce an output optical carrier whose subcarrier has modulated inphase and quadrature components with a corresponding sequence of pairs of values; and

wherein the pairs of values of the modulated inphase and quadrature phase components produced by the interfering correspond to coordinate pairs for the signal points of one of the 4-PSK 2D constellation, the 16-QAM 2D constellation, and the 16-PSK 2D constellation.

2. The method of claim 1, wherein the pairs of values produced by the interfering correspond to the signal points to about 5% or better.

3. The method of claim 1, wherein the signal points represent the 4-PSK 2D constellation.

4. The method of claim 1 wherein the signal points represent one of the 16-QAM constellation and the 16-PSK constellation.

5. The method of claim 1, wherein the splitting forms four mutually coherent optical carriers and the producing makes sequences of phase shifts on the four mutually coherent optical carriers.

6. The method of claim 1, further comprising producing a time delay of the subcarrier of each mutually coherent optical carrier between performing the steps of splitting and interfering, magnitudes of differences between the time delays for different ones of the mutually coherent optical carriers differing from an integer number of subcarrier periods by at least 0.1 times the subcarrier's period.

7. The method of claim 1, wherein the producing further comprises:

passing each mutually coherent optical carrier through a separate electro-optical phase shifter while supplying a sequence of control voltages to the electro-optical phase shifters to produce the sequence of modulations thereon.

8. The method of claim 1 further comprising:

splitting the coherent optical carrier into four mutually coherent second optical carriers;

producing second sequences of second phase shifts on each of the mutually coherent second optical carriers; and

then, interfering the mutually coherent second optical carriers to produce a subcarrier having a second sequence of pairs of modulated inphase and quadrature components; and

wherein the pairs of values of the modulated inphase and quadrature phase components of the second sequence correspond to coordinate pairs for the signal points of one of the 4-PSK 2D constellation, the offset 4-PSK 2D constellation, and the trapezoid 2D constellation.

9. The method of claim 8, wherein the pairs of values of the first sequence correspond to coordinate pairs for the signal points of the 16-QAM 2D constellation and the pairs of values of the second sequence correspond to coordinate pairs for the signal points of the 4-PSK 2D constellation or the offset 4-PSK 2D constellation.

10. The method of claim 8, wherein the pairs of values of the first sequence correspond to coordinate pairs for the signal points of the 16-PSK 2D constellation and the pairs of values of the second sequence correspond to coordinate pairs for the signal points of the 4-PSK 2D constellation or the trapezoid 2D constellation.

11. A system, comprising:

an electro-optical modulator capable of receiving an optical carrier with a subcarrier; and

a controller configured to apply a stream of sets of control voltages to the electro-optical modulator responsive to receiving a stream of digital data, the

modulator being configured to output an optical carrier with a modulated subcarrier in response to each applied set of control voltages; and

wherein the modulator is configured to respond to the stream of sets of control voltages from the controller by modulating the subcarrier to produce a stream of modulated pairs of values for inphase and quadrature phase components thereof, the pairs of values correspond to coordinate pairs of signal points of the one of the 4-PSK 2D constellation, the 16-QAM 2D constellation, and the 16-PSK 2D constellation.

12. The system of claim 11, wherein the modulator is configured to respond to the stream of sets of control voltages from the controller by modulating the subcarrier to produce a stream of modulated pairs of values for inphase and quadrature phase components thereof, the pairs of values corresponding to coordinate pairs of the signal points of the 4-PSK 2D constellation to 5% or better.

13. The system of claim 11, wherein the modulator is configured to respond to the stream of sets of control voltages from the controller by modulating the subcarrier to produce a stream of modulated pairs of values for inphase and quadrature phase components thereof, the pairs of values corresponding to coordinate pairs of the signal points of one of the 16-QAM constellation and the 16-PSK constellation to 5% or better.

14. The system of claim 11, wherein the modulator further comprises:

an optical splitter with four outputs for receiving the optical carrier;

an optical combiner with four inputs, and

four optical waveguides, each waveguide connecting one of the outputs of the splitter to one of the inputs of the combiner such that each input is connected to one output, the waveguides including electro-optical modulators connected to received the sets of control voltages applied by the controller.

15. The system of claim 14, wherein the waveguides have different lengths and wherein magnitudes of differences between the lengths of any two of the waveguides differ from an integer number of subcarrier wavelength by at least 0.1 times the subcarrier's wavelength.

16. The system of claim 11, wherein the electro-optical modulator comprises a pair of cascaded first and second electro-optical modulators; and

wherein the first modulator is configured to respond to sets of the control voltages by modulating the subcarrier to produce a stream of modulated pairs of second values for inphase and quadrature phase components thereof, the pairs of second values corresponding to coordinate pairs of signal points of one of the 4-PSK 2D constellation, the trapezoid 2D constellation, and the offset 4-PSK 2D constellation.

17. The system of claim 11, wherein the controller is configured to receive digital data and to cause the modulation of inphase and quadrature phase components of the subcarrier with two or more bits of digital data per symbol interval.

18. A system, comprising:

an electro-optical modulator comprising an optical splitter that is configured to receive an optical carrier wave and that has four outputs, an optical combiner with four inputs, and four waveguides connecting the outputs to the inputs such that each input is connected to one of the outputs, each waveguide having an electro-optical phase shifter responsive to applied voltages; and

a controller configured to apply one of a plurality of sets of control voltages to the electro-optical phase shifters in response to receiving a set of digital data, the combiner outputs the optical carrier with a modulated subcarrier in response to each applied one of the sets of control voltages; and

wherein the modulator responds to the sets of control voltages by modulating values of the inphase and quadrature phase components of the subcarrier such that the modulated pairs of values correspond to coordinate pairs of signal points of a 2D signal constellation whose signal points have equal lengths.

19. The system of claim 18, wherein the waveguides have different lengths and wherein magnitudes of differences between the lengths of any two of the waveguides differ from an integer number of subcarrier wavelengths by at least 0.1 times the subcarrier's wavelengths.

20. The system of claim 19, wherein the signal points form a representation of one of the 4-PSK 2D constellation, the trapezoid 2D constellation, and the offset 4-PSK 2D constellation.